approach

MARCH 1981 THE NAVAL AVIATION SAFETY REVIEW

Kudos by any name

IN January 1956, APPROACH began publishing a feature entitled the "Old Pro Club." This arena was used to recognize pilots for outstanding airmanship in consonance with the goals of the naval aviation safety program. Through the years, different names were used for this feature of the magazine, and in February 1972, "Bravo Zulu" became the official means to recognize demonstrations of expert airmanship and headwork.

The term "Bravo Zulu" comes from a flag hoist signal meaning "well done." (If you don't believe this, find the nearest copy of ATP 1(B), Vol. II and look at Chapter 15.) The use of "Bravo Zulu" probably was adopted by someone on the APPROACH staff who had spent too much time as part of *ship's company,* but history is vague on this point.

Since February 1972, one page of each issue of APPROACH has recognized an individual pilot or crew for safe and excellent flying above and beyond the routine. The problem was that only 12 crews per year could be given the distinction of appearing on the "Bravo Zulu" page. Many deserving aircrews were left out of the limelight because of space limitations.

Beginning with this issue of APPROACH, the "Bravo Zulu" feature will be presented in a new two-page format. Hopefully, this new format will provide a more fair sampling of distinguished aircrews throughout the Navy and Marine Corps. The criteria for inclusion in the "Bravo Zulu" feature will remain high, however.

Submissions for "Bravo Zulu" recognition should include a well written narrative of the event, any associated message traffic, a cover letter from the command justifying the event, and local wing endorsement. A quality 5 x 7, black-and-white photograph (emphasizing the individual(s), not the aircraft) must be included. All flight/survival gear shall be regulation and properly worn. These should be mailed to: APPROACH – "Bravo Zulu," Naval Safety Center (Code 72), NAS Norfolk, VA 23511.

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approach

NAVAIR 00-75-510

APPROACH photographer PH2 Bill Rogers shot this month's cover photo. See lead article for more details.

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NAVAL AVIATION

Students using Underwater Breathing Trainer.

Koch fittings released, student completes Parachute Drag Training.

Student releases seat pan and proceeds to orally inflate his LPA.

WATER SURVIVAL TRAINING

By Russ Forbush
APPROACH Writer

A 15-minute swim in full flight gear gets everyone loosened up for subsequent evolutions.

AS stated in OPNAVINST 3710.7K, "The purpose of each phase of the Naval Aviation Water Survival Training Program (NAWSTP) is to prepare all prospective and designated flight personnel and selected passengers for the training of the sea environment. This will be accomplished through demonstration and practice of proven water survival techniques and 'hands-on' training with aviation life support equipment."

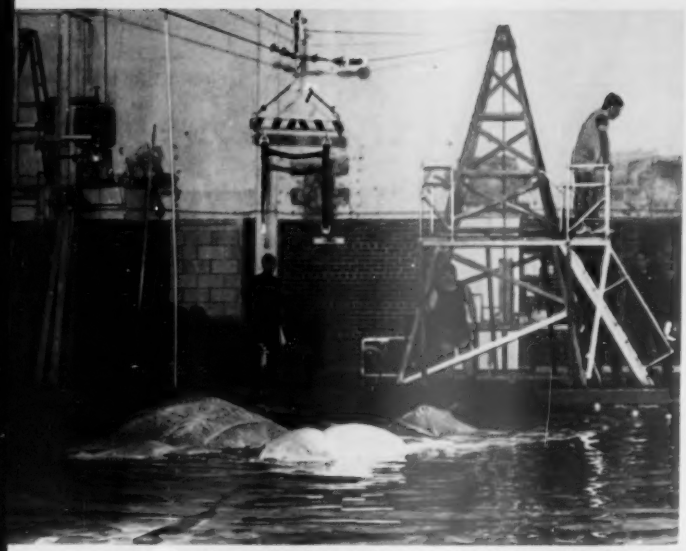
All Navy and Marine Corps aviators and about 70 percent of enlisted aircrew personnel receive initial water survival training at NAVAVSCOLSCOM (Naval Aviation Schools Command), Pensacola, FL. Refresher training is required at intervals not to exceed 4 years and is provided at facilities designated by CNO. Deep Water Environmental Survival Training (DWEST) is provided at Pensacola and NAS North Island. It is part of initial training and follows every other refresher training session at a maximum interval of 8 years. Because there is no DWEST facility on the east coast, COMNAVAIRLANT and CNAVRES are waived from this training until January 1982 when DWEST is expected to be offered at NAS Jacksonville, FL.

The basic philosophy behind all three phases of the Naval Aviation Water Survival Training Program (NAWSTP) is to provide all aviation personnel and selected passengers with the following:

- The self-realization that he/she can think rationally and perform calmly in a stressful water environment.
- Basic survival swimming skills necessary to continue survival in the water.
- Basic information on the use of all items of survival equipment likely to be encountered.
- Step-by-step procedures for all situations.
- Actual exposures to real, or as nearly real as possible, survival situations.

Training devices used within the NAWSTP to accomplish the above aims are:

Parachute Drop/Disentanglement Trainer (9F6). This device provides a means of suspending the aircrewmember in full flight gear above water while he practices parachute descent procedures. It then drops the aircrewman and parachute into a pool, requiring the student to execute disentanglement procedures. It is emphasized that by releasing the Koch fittings at the moment of water impact, most cases of en-



Working his way free from under a parachute is part of the Parachute Drop/Disentanglement training for this student.

tanglement can be avoided. If entangled, the following procedures apply.

- Solve any inflation problems immediately.
- Always back away from the chute into the wind or current, minimizing leg movement.
- Make all actions to free self from shrouds and chute slow and deliberate.
- Do not struggle. This would only tighten and compound the entanglement and weaken you.

Some training sites not yet equipped with 9F6 devices have locally modified or manufactured devices which provide parachute entanglement simulation.

Parachute Drag Trainers (9F2 and 9F2A). These devices are used to simulate parachute drag situations while the student accomplishes Koch fitting release. Basic procedures involve:

- Pulling up on one riser and pushing down on the other.
- Rolling onto the back with head out of water.
- Stabilizing self by spreading legs and releasing Koch fittings (simultaneously).

Shallow Water Underwater Breathing Trainer. This device allows aircrewmembers the opportunity to experience breathing from their oxygen masks in and under water.

- The oxygen mask and miniregulator provide a positive pressure breathing effect if the miniregulator is under water and the mask is above water, thus causing a pressure differential.
- The bailout bottle in the RSSK provides several minutes of oxygen that could save the crewmember's life in an entanglement situation, especially in low-altitude situations alongside the carrier where turbulent water and a partially-inflated LPA may hold the crewmember under water for several minutes.

Student receives instruction on proper use of oxygen mask.

NAWST Instructor briefs student on raft procedures.

Helicopter Hoist With Rotor Downwash Simulation (9H1). This new device provides an opportunity for aircrewmembers to practice boarding and hoisting techniques with a variety of rescue devices. At the same time it provides a realistic simulation of the noise, spray, and confusion present under an actual hovering helicopter. (The cover photograph for this issue was taken using this device.)

- Each rescue device (horse collar, forest penetrator, rescue net, etc.) has distinct procedures; the aircrewmember must stay familiar with them all.
- The importance of complying with all instructions from the rescue swimmer is stressed.

Underwater Egress Trainer. The "Dilbert Dunker" provides the student with a realistic environment which may be encountered upon ditching at sea. The major points derived from the training are self-control, alertness, overcoming fear and panic, and confidence in being able to escape wearing full aircrew equipment assemblies. This trainer is being equipped with a new interchangeable ejection seat modification which will allow pilots flying the F-14, F-4, A-4, A-7, and A-6 to practice procedures for their type aircraft.

Live Helo Hoist. In Pensacola, in San Diego, and soon in Jacksonville, a live helicopter hoist from open water provides the ultimate simulation of helicopter rescue. Crewmembers are required to board and be hoisted by a rescue device without assistance from a rescue swimmer.

Overwater Parasail. In its developmental stages, overwater parasail training (the central element of the new DWEST) will provide each aircrewmember an actual parachute descent into open water. The scenario from the parachute opening all the way through helo pickup will require performance of all procedures and resolution of all difficulties by the aircrewmember alone under closely supervised but real conditions.

Elements of training not lending themselves to device simulation are extensively covered in the classroom. The importance of water survival training cannot be overstressed. This is where flight personnel learn all there is to know about their life support equipment and how to use it under realistic conditions. The following example of an actual water survival situation dramatically emphasizes the problems an aircrewmember might encounter and the mistakes he might make when faced with an overwater ejection:

Scenario: Overwater ejection, winter, dusk, 8-10-foot seas, cold water, low altitude, survivor broke right arm during ejection, ejection alongside ship, 30 knots of wind, survivor not wearing proper antiexposure suit, FLU-8/P not installed.

Survivor manages to inflate left lobe of LPA (collar lobe not fully deployed) prior to water impact. He does get a full chute, which is caught in the wind and drags him in the water. His oxygen mask (on tight) provides breathable oxygen but alarms him because he is unfamiliar with the positive pressure breathing effect. Able to disconnect only the left Koch fitting because of his broken right arm, the dragging continues until the chute's deflation pockets catch in the crest of a wave and collapse the parachute.

Because of the high wind, the collapsing/rolling action of the chute drags the survivor up into the lower shroudlines, and he becomes entangled. He pulls off his oxygen mask because he fears a malfunction (pressure breathing and some

APPROACH (USPS 016-510) is a monthly publication published by Commander, Naval Safety Center, Norfolk, VA 23511. Subscription price is $15.00 per year; $3.75 additional for foreign mailing. Subscription requests should be directed to: Superintendent of Documents, Government Printing Office, Washington, DC 20402. Controlled circulation postage paid at Norfolk, VA.

water seepage). Buoyancy is minimal because of partial LPA inflation and a negatively buoyant RSSK. Although having extreme difficulty staying afloat, getting air, and becoming more tightly entangled, the survivor *doesn't* panic. He finds his right LPA toggle and inflates it.

He is able to free the entire collar lobe and is now held on the surface, greatly reducing his breathing difficulties. He immediately begins to clear all shroudlines from in front of him while slowly sculling away backwards and minimizing leg movement. Thinking he is clear, he disconnects his right Koch and attempts to swim away. Both Kochs fall, entangling themselves on the remaining shrouds wrapped around his right ankle. Unable to free the shrouds, he takes out his shroud cutter and carefully cuts only the lines hopelessly entangled around his leg. All shrouds drop away. This time he *backs* away from the chute and is not reentangled.

With his broken right arm, he is unable to open the RSSK and deploy his raft. Even with gloves on, his hands are becoming numb in the cold water. He manages to disconnect the left mini-Koch with his left hand and pulls the RSSK around to his right side and up onto his legs. With his left

Student undergoes Helo Hoist training with Rotor Downwash simulation.

hand, he opens the kit, pulls out the raft, and pulls the lanyard, inflating the raft. He releases the other mini-Koch and climbs into the raft using only one arm (a most difficult task).

At this point the *survivor* is very lucky to be alive. He didn't use his oxygen to the fullest advantage. He didn't solve his inflation problem until almost too late. He didn't continue backing away from the chute until positively clear, causing reentanglement, and he didn't connect the raft lanyard to his D-ring, almost causing the loss of his raft in the strong wind. If our survivor had not been able to board the raft, his numb fingers would have become useless in signalling a rescue, the beacon would have remained with the drifting raft, the rapidly darkening skies would have severely degraded his location by SAR crews, and without a proper antiexposure suit on, he probably would have died before morning.

Cold temperatures and darkness severely degrade any rescue attempt. The survivor, now in his raft, has to find and activate his strobe light and/or a signal flare to fix his position for the plane guard helo which he hears and sees searching for him overhead. Operating his radio and other signalling devices with numb hands and fingers is extremely difficult in the dark. Sighting his strobe light, the helo locates him. An uneventful recovery ensues except for a severe blow to the survivor's head. The survivor had attempted to help himself into the helo, although instructed not to, and in so doing, he struck his head on the door edge of the helo. (Luckily he was still wearing his helmet, and no further injuries were sustained.)

There is no better support for realistic water survival training than comments from flight personnel who have been there and survived. Statements from some of them follow:

LCDR Joe Plant – "When you find yourself in an extreme situation, you have to react immediately and not think exactly about what you're going to do. You ought to have some kind of a game plan prior to getting into such a situation."

CDR Bob Mueller – "If nothing else, what I got out of it was that there is no way in the world that you can practice emergencies too much. After the thing was all said and done, 3 days later, I found out that I did things I didn't even realize. I was doing it out of sheer habit or because I knew the procedures; we had been through them so many times. I knew what had to be done and I did it without consciously thinking about it.

LCDR Hank Wurtzbacher – "Having experienced all that training from the training command and in such a tight situation as that, with things happening so fast, I was surprised at how you react and do all those things that you were trained to do relatively long ago. It was a couple of years ago that I had gone through survival training down in Pensacola, but it's amazing, with your blood pumping and your adrenaline up, how all that stuff comes back to you. Getting away from the parachute was paramount in my mind; things that someone who didn't know any better might not have given a second thought to – but it all comes back to you. As much as you think it's a waste of time, it's really not, because when you finally find yourself in a situation, if you ever do, you'll thank your lucky stars that somebody told you how to handle it. It all happens like they say it will."

The next time you're scheduled for water survival training, keep these thoughts in mind. Learn all you can about your equipment, and diligently practice using it. Every survival situation is different, especially from the time of impact until the survivor is pulled into the rescue vehicle. Your NAWST instructors are experts in their field and dedicated to teaching you everything you need to know about water survival. Approach this training with a positive attitude, and like the survivors above, if you need it, you'll react quickly and properly. ◄

APPROACH gratefully acknowledges the assistance provided by DWEST at NAVAVSCOLSCOM, Pensacola, FL and NRMC Portsmouth's Aviation Physiology Training Unit in the preparation of this article. – Ed.

MAXIMUM FLEXIBILITY - WITHOUT GOING LIMP

By LCDR John Held
HS-8

IT was on my first WESTPAC deployment that I was introduced to what was known amongst the detachment's pilots as "Kochert's First Law." The law was really more of a rule or philosophy which was expressed as "Maximum flexibility–without going limp."

The term "can do" is well known to all of us. "Can do" spirit has always been a two-edged sword, both praised and lamented–praised because it has allowed the Navy to accomplish so much with so little. Time after time, innovation and hard work have prevailed in utilizing resources to the maximum. But then there is the other facet, the lamented. "Can do" has been interpreted to mean "If I don't, I'll look bad," and the impossible was tackled with reckless abandon, resulting in disaster. This has been particularly germane in the aviation community, where aviators have pushed themselves and their machines beyond safe limits.

Kochert's First Law kept the "can do" spirit, but expressed it as maximum flexibility. Occurrence of the unexpected or changes in the schedule are often unavoidable even with proper planning. After all, to take advantage of every opportunity is an admirable trait that maximizes resources. Inherent to the design of the helicopter is its capability to perform a great variety of missions, and because of this, perhaps more than any other community, the helo is often tasked with multiple changes in mission. "Can do" says that we can handle these, so does flexibility. In reality, being flexible provides an added dimension because the pilot is ready to accomplish any assigned task. It is, perhaps, because of this that maximum flexibility was so ingrained in my subconscious.

Let's not forget the latter portion of Kochert's First Law, "Without Going Limp." All of us who have given that 110 percent realize that it is nearly, if not entirely, impossible to sustain continual performance at that level. Eventually there's a collapse or burnout. Here's where "going limp" enters the picture. This is what must be avoided. It's difficult to provide a short explanation or precise definition of what "without going limp" means, but I think "without creating disaster by overstepping one's limitations" comes the closest.

This modifier to maximum flexibility was originated to avoid having the Monday morning quarterbacks giving their versions of what should have been done to prevent "can-do-itis" from turning a situation into worms. Maximum flexibility without going limp highlights this point. It means I'm ready and willing to give you 110 percent, but there will be a point beyond which flexibility no longer has a bearing–where physical limitations of the machine or physical/mental limitations of the aviator have been reached. Beyond this point everything becomes "limp." If everyone maintained and respected this philosophy, chances are there would be fewer flight personnel pushed beyond the point of no return. ◄

air breaks

A Near Ding. Two pilots were flying a TA-4 on a training flight. The instructor asked the pilot under instruction to perform a practice, circling, precautionary approach to Homeplate. They had briefed the maneuver before takeoff.

On final, the pilot under instruction reduced power too soon, resulting in an excessive sink rate. Neither pilot arrested the sink rate and the aircraft made a jarring, tooth-rattling, 8G touchdown. Needless to say, they rolled out to a full-stop landing.

During rollout, as the airspeed decreased through 80 knots, excessive airframe vibrations were encountered and the *Skyhawk* tended to turn left. Directional control was maintained with aileron and rudder, and the aircraft was braked to a stop. It was discovered that the port main landing gear tire was blown.

The pilots called for help, and ground personnel proceeded out to the runway to inspect the TA-4 and to change the tire. The aircraft was towed back to the line and, after a more thorough inspection with no discrepancies noted, was released for further flight.

This was one more example of the instructor (read: checkpilot/PPC/TPC/HAC, etc.) not taking timely action to prevent trouble. Any pilot, when giving instruction, must be prepared to take control any time attitude, altitude, or airspeed is not within the envelope for the *practice maneuver.*

A Tad Short. First of all, let's set the scene. It was just a few days before spring had officially arrived. The air station had been plagued all winter with a lot of snow and generally lousy weather. This particular night the temperature was in the forties and the sky was obscured. The visibility had been zero in fog but, at the time of the incident, it was all the way up to one-half mile, with light rain and fog. The wind was calm to southerly at 5 knots.

The pilot in command of the C-118 was an old head. He had more hours in the C-118 than most pilots have total time. He was highly experienced, fully qualified, current, and was the squadron NATOPS checkpilot. His copilot and flight engineer were also experienced, qualified, and current.

They were returning to Homeplate that night after completing a scheduled airlift. They were handed off by Approach to GCA. On his initial approach to the field, the pilot descended to DH but elected to wave off when he did not like his alignment; he had sighted the runway.

The TPC followed GCA missed-approach instructions and swung around for a second approach. The second approach was normal, and the runway environment was picked up at DH again. This time they had the runway centerline boresighted.

The pilot then pulled a boo-boo. He ignored further glide slope information and continued his approach visually. His eyes sold him down the river. He thought he was high, increased his descent, and touched down 150 feet short of the runway, on the paved portion of the overrun.

The overrun had not been completely plowed, and a batch of ice and snow, thrown up by the gear, dented belly skin and roughed up the underside of the flaps. The rough landing area caused rivets to pop, but damage to the aircraft was limited.

Obviously, the pilot was sucked in by an optical illusion. When he transitioned to the runway from the gages, he made an error in judgment and was zapped. The entire cockpit crew couldn't have been more surprised when they touched down sooner than expected.

All pilots need to remember that the transition from cockpit instruments to outside references in marginal conditions is a trap. BEWARE!

Improper Switchology — Again! Recently, APPROACH reported the first case of improper switchology that we've seen in a long time. A *Skyhawk* driver inadvertently "pickled" his centerline fuel tank when he thought he was launching his TAU-10 dart aerial target. No sooner than that story went to print, a not-to-be-outdone sister service pilot did his thing in a grand fashion.

The *Phantom Phlyer* was No. 2 in a four-plane bomb/rocket delivery hop on a raked range in a southwest desert

restricted area. Things were going along alright, but the TOT (time-on-target) was running out for the *Phantom* flight. The deliveries were 45-degree rocket runs, and the flight had several rockets left to expend. Rather than returning to base with live ordnance aboard (requiring a straight-in), the flight leader asked the other members of his flight to select "ripplefire" on their final run. Old Dash 2 complied (he thought) and set himself up for his last run. On airspeed, altitude, and dive angle, release was made – rockets, rocket pod, and all from the port inboard TER! Although the "hit" was well at the 6 o'clock position, no one was injured on the ground as a result of this inadvertently expended piece of "ordnance."

Not much more can be said in this case than could be said in the A-4's case. Improper switchology continues to raise its ugly head. Proper switchology is stressed in briefing after briefing, yet someone manages to goof it up sooner or later. It looks as though the flight leader will have to get in the cockpit with his flight (whenever "beaming" gets out of the Sci-Fi stage and into reality) and prevent future incidents of *improper switchology*. Until that time comes, it looks as though flight leaders will not only have to reiterate proper switchology during their briefs, but in the air, too! It may add a little to the chatter over the freqs, but words are cheaper than lives, aircraft, and equipment.

Routine Tanker Mission. Following the successful transfer of all external fuel from his tanker-configured *Corsair II*, LTJG Dave Shinn noted an apparent failure of the wing transfer system. Selection of the emergency fuel transfer system initially produced the desired fuel quantity indications, but shortly it became apparent that the main fuel system, which feeds the engine, was being depleted at an inordinately high rate, and that wing fuel transfer was either inoperative or insufficient to keep up with the loss from the main system.

With about 4,000 pounds of main system fuel remaining, LTJG Shinn was joined by his flight leader, LT George Payne. Noting fuel streaming from the underside of LTJG Shinn's aircraft, LT Payne immediately sized up the seriousness of the situation, headed the flight aft of the CV, and called for an emergency pull forward. At this time, the deck was in the midst of a cyclic-ops, aircraft respot with 10 aircraft in the landing area and three sets of arresting gear out of battery for functional checks. When informed that the flight would have a ready deck in about 10 minutes, LT Payne advised the tower that LTJG Shinn's aircraft could probably not stay airborne that long, and requested a ready deck as soon as possible. Shortly thereafter, the flight was advised that the CV was turning into the wind and the deck would be ready in 4 to 5 minutes. LTJG Shinn commenced dumping wing fuel for the recovery.

With approximately 3,200 pounds remaining in the main system, LTJG Shinn noted a LOW FUEL warning light and, acting on the recommendation of LT Payne, jettisoned his external stores. A little over 4 minutes after the initial request for an emergency pull forward, the tower called a ready deck and LTJG Shinn commenced the final portion of a straight-in approach, landing aboard with 2,200 pounds indicated and a steady LOW FUEL warning light. Downlocks were quickly applied to the landing gear, the engine was secured, and LTJG Shinn exited the still badly leaking aircraft. Troubleshooters found a ruptured CSD oil cooler unit to be the source of the fuel leak, and estimated that 400 to 600 pounds of usable fuel remained in LTJG Shinn's aircraft at touchdown.

It was truly a superb team effort: by the skill and professionalism of LTJG Shinn, as well as the expertise and decisiveness of LT Payne, both of VA-37; by the expeditious and smoothly coordinated efforts of the flight deck crew of the USS SARATOGA. They pulled off a critical save that left no room for error or indecision. Attaboy, you all.

In a Bind. About 40 minutes after disengaging from the tanker drogue, the pilot noticed that the stick would not move right but would move left, forward, and aft without difficulty. As the pilot pushed over to clear the tanker, right stick control was regained. No control problems were noted during the remainder of the flight.

The controls were checked following an uneventful straight-in carrier landing. Maintenance personnel found a small triangular piece of plastic (from instrument panel lighting) in the eddy current dampener area. This piece of plastic evidently lodged in the roll control linkage, restricting right stick travel, and then dislodged when the pilot pushed over to clear the tanker. Failure of maintenance personnel to account for all parts and pieces going into or out of an aircraft led to the incident, which could have ended in disaster. ◄

Mast – Ectomy

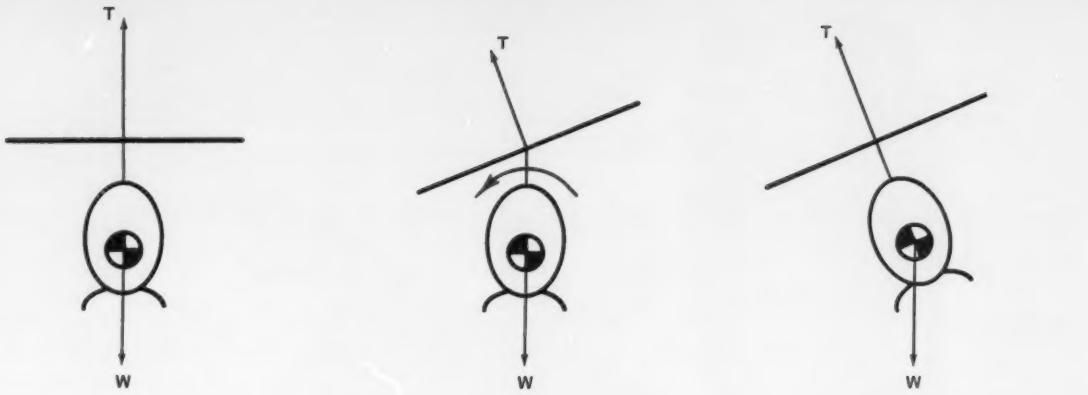
By Maj J. P. Cress, USMC
Naval Postgraduate School, Monterey, CA

DON'T mistake the title with one of medical significance. But don't fail to let the word and the picture on the left convey a message of concern. Taken one way, the word could be the story of a surgeon saving a life. Spelled as it is above, it tells the tale of a pilot inadvertently taking his own and other lives with him through misuse of his aircraft.

The cause of the accident above is more commonly known as mast bumping, a condition in which a helo's main rotor is caused to contact, deform and, too frequently, sever a helicopter rotor mast. Peculiar to semi-rigid (teetering) rotor systems, it has long been known to occur during turnup or shutdown with controls displaced from neutral or with neutral controls when even light winds are present. Slope operations also have long been known to increase the risk of mast bumping. Inflight mast bumping, however (once a problem of little concern), is far less likely to be forgiving of the transgressing pilot. It was found to have been the cause of more than 50 fatal accidents over the last several years among U. S. Armed Forces which employ semi-rigid rotor helicopters. How can we avoid adding to the total?

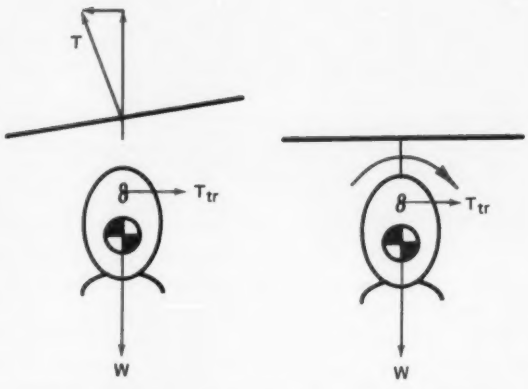
We have implied that the problem occurs when the rotor head tilts (with respect to the mast) and contacts the mast; in other words – when the rotor flaps excessively. Generally speaking, flapping amplitudes reach only a very small proportion of the maximum allowed for maneuvers within the envelope. As an example, provided that retreating blade stall is avoided, high forward flight speeds at high gross weights and density altitudes result in flapping angles of approximately 15 percent or less of the maximum allowable for a typical semi-rigid system. Assuming center of gravity limitations (forward center of gravity limits in particular) are not exceeded, gusty conditions can further increase rotor flapping by a similar amount. Sudden changes in attitude, as induced by abrupt cyclic input or by mechanical failure (e.g., tail rotor or engine loss), can also increase flapping values to as much as 60 to 70 percent of the rotor/shaft limit. Right sideward flight at maximum permissible speed will increase flapping similarly. But the most critical maneuver in regard to mast bumping is one that seems a natural part of our terrain flying tactics – the pop-up and pushover (roller coaster) maneuver.

It's really the pushover, or low-G portion of the maneuver, which proves most perilous. To really understand why, think back on your knowledge of helicopter control. If the pilot desires a change in pitch or roll attitude, the primary control is cyclic, which allows tilting of the rotor thrust vector with respect to the mast. As a result, an unbalanced moment is generated about the aircraft center of gravity, and fuselage attitude is changed. (See Fig. 1.)



(a) neutral cyclic (b) lateral cyclic causes rolling moment (c) trimmed roll attitude and lateral motion

Fig. 1



(a) symmetric 1G flight (b) symmetric zero G flight

Fig. 2

Fig. 3

A more detailed look at forces acting on a helicopter in symmetric, 1G and zero G flight is shown in Fig. 2.

Note that, in Fig. 2 (a), rotor thrust is tilted slightly left so that the horizontal component of main rotor thrust will balance the tail rotor thrust and provide for lateral equilibrium. In Fig. 2 (b), the pilot has induced a condition of near zero thrust by reducing collective in conjunction with relatively rapid forward cyclic application. Consequently, with no force to balance tail rotor thrust, left yaw, right sideslip, and most importantly, right roll result even though lateral cyclic remains neutralized.

As the roll accelerates, the tip path lags the fuselage rolling motion slightly, depending on the roll rate and other design characteristics of the rotor. This results in a condition in which the clearance between rotor and shaft is reduced. They are no longer perpendicular; in other words – in the lateral plane, as illustrated in Fig. 3.

This clearance reduction is minor, however, and will not in itself lead to mast bumping. But recall that the aircraft is continuing to roll to the right, despite neutral lateral stick. Instinctively, the pilot would counter with left cyclic in order to stop the right roll. Response to the left lateral control will cause upward flapping on the advancing (starboard) side of the rotor disc, thereby further decreasing the clearance between the rotor head and the mast on the retreating (port) side. Such an input to a *loaded* rotor would tilt the thrust vector opposite the direction of the roll, thereby creating a moment tending to return the aircraft to the proper roll attitude. In the zero (or low) G condition, however, rotor thrust is virtually nonexistent and no restoring moment results

Fig. 4

from tip path tilt. The unwary pilot, with the instinctive left lateral input, would quickly cause the rotor to contact the mast. The torsional driving load, in conjunction with bending loads due to this contact, could then cause a mast failure as shown in Fig. 4. Need we say more?

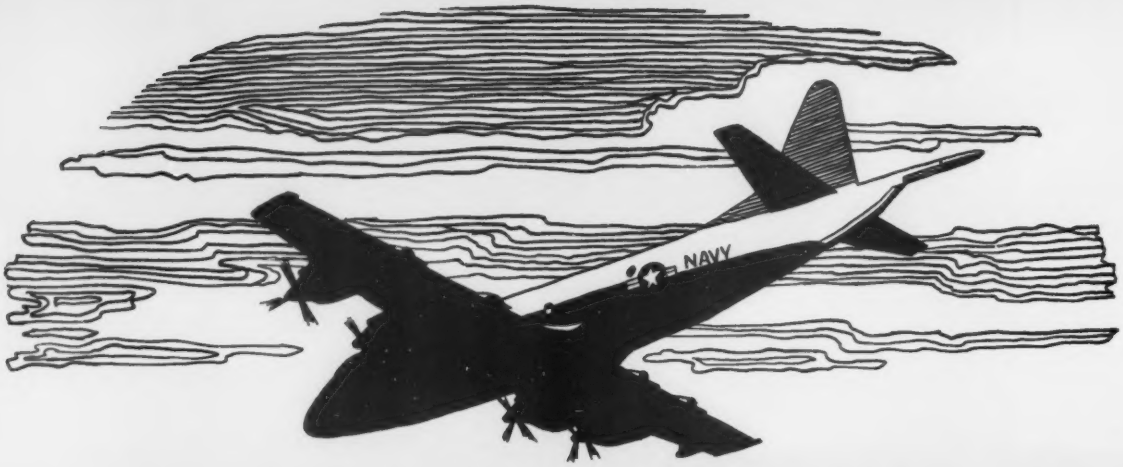
How do you avoid this method of littering the countryside? By avoiding the low/zero G condition, of course. *(It must be stressed that this is the only good solution to the problem. The corrective technique that follows is extremely critical and should not be viewed as a viable alternative to avoiding the low/zero G condition. – Ed.)* But if you inadvertently find yourself in this situation, how do you save your neck?

The first concern must be restoration of the thrust vector, i.e., reload the rotor. Once rotor thrust is restored, the pilot will again regain normal attitude control through the use of cyclic pitch.

What is the quickest and safest method for reloading the rotor system? While both aft cyclic and collective inputs will restore rotor thrust, collective application will also change engine power output. Extensive contractor flight tests with a production model gunship have indicated the possibility of rotor underspeeds or gearbox overtorques (depending on altitude) when utilizing collective to recover from low-G roll. Yaw trim difficulties were also found likely. Aft cyclic application, however, was found to quickly restore control power and decrease right roll rate. Since this method was found not to cause any of the disadvantages of the collective recovery, aft cyclic is considered the best method of thrust restoration. Once thrust is regenerated in this manner, left lateral cyclic may be used in roll recovery without fear of mast bumping.

Remember:

- **Don't put yourself in the low-G or zero-G environment.**
- If low G or zero G is encountered, expect an uncommanded right roll (due to tail rotor thrust) and severe reduction of response to lateral cyclic.
- Do not attempt to control the roll with left lateral cyclic until main rotor thrust is restored through the use of aft cyclic. *(Unless aft cyclic is applied immediately upon the onset of right roll, the aircraft may become inverted. – Ed.)*
- The mast-ectomy is self-prescribed bad medicine for which there is no antidote. Prevention is the only cure. ◄



DRILLS

By ENS Claude J. Wortham, Jr.
VP-11

"This is a drill! This is a drill! Execute the fire bill!" comes through the intercom system of the P-3 *Orion*. Immediately, we students start on our predictable way, scrambling through the aircraft in search of a fictitious fire as the instructors stand by and watch our every move. As a student, I often wondered, as have many others, *why* so many emergency drills?

Unfortunately, it wasn't long after reaching my ultimate duty station that I truly understood the reason for the seemingly unending emphasis on Section V of the NATOPS Manual. It was a routine tactical training mission in an operational area off the coast of Maine. Everything was normal until we started home. The flight station executed the fire bill, but this time it was no drill. The crew responded immediately, and in a few seconds, a smoking piece of equipment was isolated and secured. It wasn't until this time that I fully realized what had just happened; in those few seconds I had done exactly what I was supposed to do without consciously thinking about it. It was as natural as moving my hand away from a hot flame.

It was only then, after those few seconds, that I came to fully appreciate those many emergency drills during training. I now also realize that we should possibly have had a few more drills. When the emergency is real, Section V should be a natural response to an emergency situation – a reflex. Nothing less will do. If that is what the instructors wanted of their students, they succeeded. ◄

1st Lt S. R. McMeans and 1st Lt M. D. Murphy

A CH-46F, piloted by 1st Lt S. R. McMeans (HAC) and 1st Lt M. D. Murphy, copilot, of HMM-265, was the fifth helicopter of a five-helicopter troop lift from PMRF Barking Sands to MCAS Kaneohe. In addition to the four-man flightcrew, there were 18 combat-loaded Marines aboard.

Approximately 28 miles from shore, the HAC observed a fluctuation of oil pressure on the No. 1 engine and shortly afterwards heard the No. 1 engine wind down. Altitude was 1,000 feet. As the engine wound down, the HAC observed No. 1 TQ spinning, N_r dropping, and No. 1 T_5 and N_g falling. He immediately beeped No. 2 engine to maximum, flared to attain 70 KIAS, and yawed the helo to the right, initiating single-engine procedures.

1st Lt McMeans broadcast a Mayday and notified the leader that his No. 1 engine had flamed out. He ordered the crew to commence jettisoning fuel, armed the emergency throttle, started the APP, and told the crew chief and first mech to start throwing excess gear and baggage from the crew door and ramp.

The leader gave the HAC a heading to the island of Kauai and detached the No. 4 helo to accompany 1st Lt McMeans. By now, the HAC was able to maintain N_r at 94 percent. He secured the fuel jettison with 325 pounds per side remaining. Emergency throttle was beeped to 750 degrees T_5. He leveled the aircraft at 700 feet and managed to attain a 50-100 fpm rate of climb. At 1,000 feet, he leveled off and ordered the jettisoning of excess gear stopped. Single-engine and ditching procedures were then reviewed.

When they were 7 miles from land, the accompanying helo proceeded ahead to scout for a suitable emergency landing site. A hard-packed dirt road, oriented into the wind, was found, and the chase aircraft landed. The HAC set up for his single-engine approach with T_5 set at 730 degrees. A successful landing was made, cushioned by full collective.

The flameout was due to the failure of the frame front accessory drive bearing, which caused the complete loss of the accessory section. 1st Lt McMeans and his crew distinguished themselves through their professional handling of this critical airborne emergency.

LT H. F. (Buzz) Schaffer

ON a student air navigation cross-country flight about 20 miles southeast of Holly Springs VORTAC on V-159, Memphis Center cleared VV3E634 from 8,000 feet to 4,000 feet. During the en route descent and passing 6,500 feet, LT H. F. Schaffer, a VT-3 instructor pilot, felt a sudden shudder of the airframe that also created fluctuations on his engine instruments. Prop RPM, N_1 RPM, oil pressure, and fuel flow all fluctuated momentarily. Oil pressure then stabilized at 50 psi, 15 psi below normal. There were no secondary indications.

The T-34C has a history of many oil pressure transducer failures. Knowing this, and with no secondary indications, LT Schaffer could have easily rationalized delaying any immediate action. Fortunately, he lost no time in reducing power below 850 ft-lbs and electing to shoot a precautionary emergency landing to Holly Springs, the nearest field with an instrument approach. He was flying over an undercast at the time.

While the student, ENS Presler, reviewed the NATOPS pocket checklist, LT Schaffer declared an emergency to Memphis Center, and upon leveling at 4,000 feet, VV3E634 received clearance from Center for an approach and clearance to land. Center cleared the aircraft to 2,400 feet, but LT Schaffer requested and received clearance to remain at 4,000 feet until commencing approach.

Oil pressure was falling at a slow but constant rate through the entire evolution. VV3E634 entered the undercast at 2,400 feet and broke out at about 1,500 feet on final, with oil pressure indicating only 25 psi and continuing to

fall. An uneventful landing ensued, and the aircraft was shut down.

Postflight inspection and maintenance revealed a clean engine with a massive oil leak about the nose cowling area (reduction gear section), no indication of any FOD ingestion, and no oil on the dipstick. Final maintenance action revealed that an O-ring had failed. Holly Springs airfield provided a pay phone for contact with Homeplate and a dry business office for the pilots.

Not defeated by complacency, but sustained by professionalism, knowledge, and skill, this crew saved a valuable aircraft.

LCDR Ed Luedeking and ENS Larry Davis

FOUR minutes after taking off in their T-2C *Buckeye*, LCDR Ed Luedeking and his student, ENS Larry Davis, were struck violently by another aircraft at 8,000 feet. They were struck from behind and below. Neither the instructor nor the student saw the other aircraft. Neither was initially aware of what had happened.

Because of the violence of the collision, LCDR Luedeking thought that the T-2 had exploded or that he was being involuntarily ejected. After the initial confusion passed, they began taking action to save the aircraft. LCDR Luedeking turned toward homebase and broadcast a Mayday. Noting that both engines had flamed out, he began airstart attempts while instructing ENS Davis to dump tiptank fuel and squawk EMERGENCY on the IFF. He could not get a relight on the No. 2 engine, but No. 1, though severely FODed, came up to about 70 percent rpm.

In addition to the engine problems, the emergency was further compounded by loss of the entire nose cone. This resulted in having no airspeed or AOA indications. Nevertheless, LCDR Luedeking estimated that he could make the runway if No. 1 kept delivering at least minimal power.

Approximately 2-3 miles from the runway, he lowered the landing gear but then realized the additional drag would cause him to land short of the runway. He then raised the gear until he was over the runway. He lowered the gear again, having already made a decision to initiate command ejection if he failed to get a down and locked indication. As soon as the gear indicated down and locked, he landed and made a long field arrested landing. Well done to LCDR Ed Luedeking and ENS Larry Davis for their professional teamwork.

Maj K. D. Hines and Capt D. L. McConnell

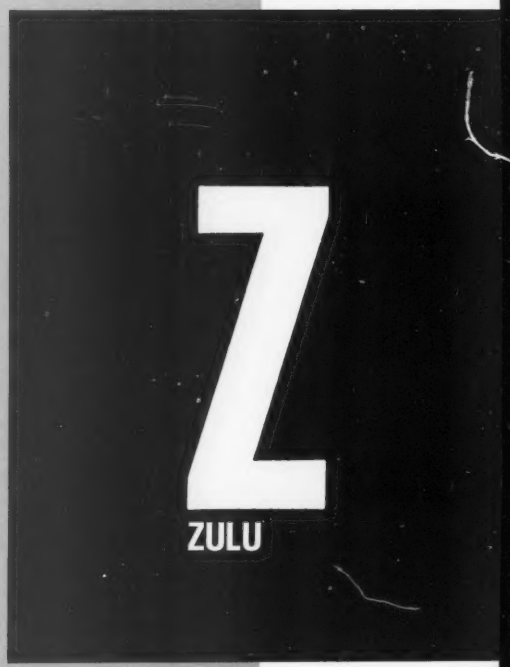
The C-130 support aircraft which flies with the Blue Angels, and is affectionately known as "Fat Albert," was instrumental in preventing the possible crash of a civilian commercial aircraft.

While en route across the Western Atlantic area, radio monitoring made it evident that a civilian aircraft had become disoriented and was dangerously short of fuel. The crew of "Fat Albert" plotted the troubled aircraft's position and navigated to the general location to begin search operations.

Approximately 20 minutes later, the lost aircraft, which was then critically short of fuel, was visually located. "Fat Albert" joined on the lost pilot's wing and began giving precise vectors in addition to ground speed, time remaining, and course/time information to the nearest land mass.

Due to the timely and accurate information provided by the "Fat Albert" crew, the pilot of the civilian aircraft was able to safely land his aircraft at South Caicos International Airport with approximately 3 minutes of fuel remaining.

The professionalism shown during the entire incident was instrumental in preventing a probable aircraft accident at sea and the loss of human life. The all-Marine crew of "Fat Albert" included: Maj K. D. Hines, Capt D. L. McConnell, GySgt Herb Vogt, SSgt Dave Eckley, and SSgt Dale Tinline. ◄



LOW-LEVEL

THE low-level environment is dramatically unforgiving. A small distraction, a tiny judgment error, or a brief mental lapse can transform your beautiful sleek flying machine into a disintegrating ball of fire and metal with you in the middle – not a pretty picture. Enemy detection avoidance and the surface-to-air threat will force us to operate at low level for most current combat scenarios. The old cliche, "We must train like we will fight," still applies. This means we must be able to operate effectively and safely at low level.

TRAINING

By LCDR Joseph E. Hart
VA-97

Recently, a rash of accidents occurring in the low-level environment has forced commanding officers to sit back and ask some serious questions regarding their current low-level operating doctrine. There has been a great deal of lip service devoted to the subject, but it has not seemed to solve the problem. The repeated preaching, "Don't fly into the ground," "Don't bust your minimum altitude," "Don't get steep in your run," "Don't pull out low," etc., etc. is just not good enough. This prudent "fatherhood" must be backed up with a training program specifically designed for operations at low altitude.

The realization that task loading versus basic airmanship and terrain avoidance have a direct correlation must be understood. The skill level required to fly a single aircraft at 200 feet over flat terrain is much lower than the skill level required to fly a section at 200 feet in mountainous terrain while executing a SAM break. Target attacks must be practiced so they can be precisely executed. Attacks must be thoroughly researched and backed up with hard go/no-go criteria. A pilot must know that if he peaks out at 2,500 feet on a pop-up attack and requires a dive angle in excess of 20 degrees, he has exceeded the safe delivery parameters for his attack and should abort. Tactical low-level formations must be stressed and practiced to allow limited communication operations.

Present RAG low-level training is limited to low-level navigation and a few "canned" low-level attack weapon deliveries. It is assumed that when the "nugget" arrives at his squadron he can operate competently at low level. This is not always true. Each squadron must develop its own low-level training syllabus to stress low-level awareness, navigation, formations, and strike/attack tactics.

The Air National Guard Fighter Weapons School at Tucson, Arizona has published some excellent handouts dealing with low-level awareness training, low-level formations, and battle area tactics. The term *low-level awareness* is one I think we will hear quite frequently in the future. This training delves into the physical and psychological aspects of low-altitude operations and then applies these principles in an airborne training syllabus designed to make the pilot aware of his capabilities and limitations. The program strives to lower the pilot's operating altitude while giving him a foundation to recognize overload situations in which he will have to raise his altitude in order to safely cope with the tasks at hand.

In summary, our approach to low-level operations needs to be readdressed and upgraded. Now is the time for each squadron to get on the bandwagon and develop a concrete low-level training plan to allow each pilot to closely examine this flight regime. Once a pilot is initially trained, he will have to maintain proficiency in low-level flight. This will be a challenge to the operations and training officers. Let's train like we will fly in combat, but let's train safely and thoroughly.

How to get hurt without really trying

ASK someone injured in an on-the-job accident if he or she thought this would happen to them and, in most cases, you'll get an emphatic, "Hell no!" People with all their "marbles" don't deliberately set out to get themselves killed or injured. What generally happens is that one of the following factors set them up for an injury:

- Circumventing or ignoring written regulations
- Inexperience
- Haste
- Inattention
- Complacency

These factors are clearly present in the accidents involving injury described below:

- A plane captain was assigned as a member of a crew to tow a UH-1N aircraft to and from the wash rack. On the return trip to the hangar, the plane captain engaged in some idle banter with another man, directing his attention away from the aircraft momentarily. During the brief period of time he was out of sight of the tow tractor operator, he stepped too close to the *Huey* and his right foot was run over by the ground handling wheels supporting the weight of the aircraft. His right foot was fractured. The plane captain's boss had this to say, "Careless and inattentive members of any crew, whether it be a flightcrew or a towing crew, will sooner or later be caught by that inattention."

- A qualified airman lineman was assigned to act as safety observer during a high-power turnup of the inboard engines of a P-3B aircraft. Prior to application of high power, he was directed by the flight engineer (FE) onboard to position himself at the port forward quarter away from the path of the No. 2 engine. As engine power was being altered between 1,000 SHP and 3,000 SHP, the airman noticed that the lock for the main cabin hatch was lying on the deck aft of the No. 2 engine. He decided to pick up the lock to prevent any engine damage. While crossing behind the No. 2 engine, he was caught by the engine exhaust and prop blast and blown to the ground aft of the aircraft in a rough area of coral rocks and weeds. When 50-60 feet aft of the main cabin hatch, he regained his footing and passed aft of the tail and forward on the starboard side, outboard of the wingtip.

At this point, his presence was noted by the turnup crew, and when he regained his position on the port quarter, they realized that his hands were bleeding. The engines were shut down and the airman was escorted to the hangar where he was met by a corpsman who had been summoned by the FE. The AN was given first aid and then taken to the dispensary. His injuries consisted of a cut on the left elbow and abrasions on the palm of his left hand. It was noted in the incident report that the injured airman is young, strong, 6-feet tall, weighs more than 200 pounds, and is a lineman on the unit football team. Nevertheless, he was tossed around by the prop blast like a tumbleweed. He was well trained and had a good safety attitude up to the point where an oversight by his

shipmates (failure of the FE and senior mechanic to notice the unsecured main cabin hatch lock) became more hazardous in his mind than the engine blast. Rather than signal for engine cuts in accordance with his training, he placed himself in harm's way. Once again it has been proven that there is a narrow gap between safe operations and possible tragedy when even a brief lapse in attention occurs.

• While configuring an F-14A with auxiliary fuel tanks for a required exercise, a fuel quantity indication discrepancy was discovered. It was determined that the tanks had to be downloaded to correct this discrepancy. The crew leader (an AD1) requested a defuel but was informed that a significant delay was imminent due to other aircraft awaiting defueling. The *Tomcat* was then taken to the hush house so that fuel could be burned down/transferred. The aircraft was turned with the wing/external transfer switch in the override position until the fuel totalizer indicated 3,800 pounds remaining. It was then returned to the hangar where the tank sight gage was checked. The ball indicator was not visible. The crew leader then "tap" tested the tank with a closed pocket knife. Based on the results of this test and the fact that he could easily lift the rear of the tank, he decided that the tank was empty and could be downloaded. Two men were positioned on the aft section of the tank and two forward to lower the tank to the deck. When the manual release was rotated, the tank fell to the deck, injuring both men handling the aft end of the tank. Injuries were to each man's right knee and were classified Bravo. Failure to adhere to established maintenance procedures, compounded by supervisory error and lack of experience, led to this incident. The checklist for the evolution was not used and the crew leader was inexperienced in working with F-14 auxiliary tanks. In the words of the CO, "It is extremely fortunate that this incident did not result in more serious injuries. Any external fuel tank that cannot be positively proven empty should be presumed full. To say it another way: if there is **any** doubt, there is **no** doubt. Naval aviation maintenance records are full of 'empty' stores that were full and 'empty' guns that were loaded."

• An ordnanceman was attempting to weld a short steel bar to a Mk-1 Mod 3 inert 2.75-inch rocket warhead to make barbells for use in his division's physical fitness program when a part of the threaded portion exploded. Fragments from the explosion caused a surface injury near his right hip. There was no other damage or injury to personnel. The inert rocket head is filled with an inert plastic type material which apparently expanded as heat was applied with the welder. This expansion ruptured the base of the inert rocket head, and flying fragments resulted. Failure to comply with established guidelines and attempting to modify ordnance materials caused this incident.

• An AMHAA assigned to an A-6E corrosion control work center was receiving safety training on the *Intruder* GRU-7 ejection seat. As he stepped on the port intake of the A-6, his foot slipped and, in attempting to break his fall, he frac-

tured his right wrist. His injury could lead to partial disability. In regard to this mishap, his CO stated, "Very few innovative methods have been discovered to injure people or damage aircraft in the A-6 community. This incident was no exception. Safety awareness must be instilled in each individual throughout his career, beginning with 'A' school, continuing with FRAMP training, and in his fleet squadron. To eliminate the 'reinvent the wheel' syndrome, the 'corporate memory' must be continuously stimulated. Squadron indoctrination training now includes standard A-6 safety related hazards."

• Four jet mechs were installing an engine on a KA-6D on a carrier hangar deck. The engine was positioned under the starboard engine compartment with a 4,000-pound stand. Two Aero-14C bomb hoists were being used to raise the engine. Both hoists had been checked after being issued by the GSE shop, and no discrepancies were noted. The engine was raised to engage the forward/rear mounts. Once the engine was properly positioned, the mechs had difficulty installing the forward mount pip pin, so the engine was lowered slightly. As the engine was again raised, the crew leader went beneath the engine to ensure that the engine side mounts were aligning properly. At this time, both bomb hoist cables separated and the engine fell, pinning the crew leader against the 4,000-pound stand. Other hangar deck personnel saw the incident and, using GSE, lifted the engine off the injured crew leader. He was taken to sickbay where it was determined he had suffered superficial contusions and lacerations to his right chest, right leg, and thigh. It is mighty fortunate that he was not more seriously injured. Although the primary cause factor in this incident was material failure of the bomb hoist swedge/cable, the crew leader used poor judgment in positioning himself directly under the engine. As the CO stated, "The MIMs for jet engine installation do not address the hazard of positioning oneself under an engine suspended only by bomb hoists; however, the danger involved is common knowledge and makes good sense."

Injuries such as those described above are "the pits" for safety-motivated COs and safety officers. Unfortunately, they can occur in units with outstanding safety programs as well as to those units that use the "winking eye" approach to safety. Chances are, though, that the units that "practice what they preach" regarding safety will **try harder** when someone is injured and, in the long haul, they will still be winners.

Speed is life!

By LT Dennis Gillespie
CVW-1 LSO

HOW many times has the CAG LSO come into the ready-room with a frown on his face? Not the usual one, but the one caused by a jet pilot taking a *cut in the wires.* Not often, hopefully, but it happens all too frequently and needlessly.

Tactical naval aviation has enough difficult aspects to keep a driver busy. Between the night cat shot, tanking, night dive bombing, and air combat maneuvering, there is an endless list of ways to end a flight in tragedy. The carrier arrestment, although most veteran pilots become comfortable with it, remains the maneuver with the greatest degree of risk. Glide slope, lineup, and airspeed, in conflict with wind and a moving ship, add up to one of our most coordinated and difficult actions.

Once a hot driver crosses the white rounddown and feels the initial tug, his tendency is to turn off the lights and relax. But it's not over yet!

One *Corsair* pilot experienced the unusual and unexpected on a black night in the Mediterranean. After touchdown, the arrestment felt normal, so normal in fact he turned off his lights. At that point, however, while still at MRT, the hook broke off the aircraft after approximately 140 feet of runout. The aircraft left the deck and immediately rotated to a near-stall attitude and settled. The luck of the Irish kept the aircraft dry, and a relatively uneventful tank and Bingo to the beach resulted. The hook was left on the deck, along with the partially extended three-wire.

No one knows why the aircraft kept flying that night, but one sure bet was that if this pilot had taken his **cut in the wires**, we'd be short one costly A-7E and, possibly, one pilot. That's an expensive price to pay for not following procedures learned at initial CQ in the training command.

Now I understand my old CAG LSO's frown while debriefing the *cut.* I'm glad I didn't take one that night in my trusty *Corsair!* As an old, mean CAG LSO now, I hope my air wing pilots believe the adage: **"Fuel is time, speed is life."** ◄

C.R.A.M.M. for flight

By LTJG Steve Miller
HS-8

WITH flight time becoming increasingly scarce, operating costs escalating, and ground job responsibilities increasing, it is more important than ever to **C**oncentrate, **R**eview, **A**viate, **M**otivate, and **M**aximize for flight.

Concentration is vital with the machines we fly today. Mental and physical errors are unforgiving. Numerous articles have been written concerning changes in lifestyles, worrying about collateral duties better left behind on the deck vice being in the cockpit, and distractions both physical and mental. All of us have contended with these at one time or another. Habits take over when concentration is lost—sometimes to our benefit, sometimes to our demise. Without concentration on the task at hand (aviating), the pilot is automatically placed behind the power curve. Adequate rest and physical conditioning are both positive steps to improve one's ability to concentrate.

Review is next on our list. When was the last time you studied your emergency procedures? After-the-fact study will not cut it! It has been proven that continual review increases the chance of proper response in stressful situations. The flight brief provides an excellent place for reviewing and discussing the scheduled flight evolution. If procedures, techniques, emergencies, etc. are discussed ahead of time, there are fewer distractions, and it's easier to concentrate. (How about that? Review supports concentration!) APMs/AOMs provide a forum for discussing a variety of experiences/hazards encountered by others, thus providing a data bank for future responses.

Aviate. Here's the fun part. Now that we're in the air, we can hone those flying skills to a razor's edge. We are now accomplishing what that wonderful machine of ours was designed for. We're *concentrating* on the task at hand, and we've *reviewed* what we were to do ahead of time.

Motivate. Without motivation, boredom would set in and corners would once again be cut. Methods of motivating vary, but ensuring there is a purpose behind what is being done helps. Each flight should provide training for **ALL** members of the crew. When any training gets monotonous for any crewmember, he should, if feasible, request a change in the routine. This will help maintain a high level of motivation in the crew.

Maximize. Time is valuable, and each flight-hour is expensive. For this reason, every hour in the air must result in maximum training. Flight simulators should also be used to increase flight proficiency. Emphasis on basics and emergency procedures are a must. Here's where good habit patterns are built. Your level of skill in handling emergency procedures might mean the difference between life and death.

If you've waded through this article, it should be apparent that each element of CRAMM is required. Use them all and you'll be a better aviator for it. ◄

CONSPIRACY

WE are at war, and naval aviation is under attack! For the past several years, the occurrence of a birdstrike was always taken as an isolated incident with no apparent strategic significance. Were it not for the birds, men could pilot their machines about the skies unmolested, free from any obstruction other than themselves. One must remember that, before man's first flight, the birds were alone in their environment, free to soar among the clouds and chase rainbows. Now, due to man's progress in aviation, we have managed to invade the sanctity of the birds' airspace and work under an assumption that they are willing to cohabitate with us in their environment.

In the beginning, when there existed only a few aircraft, the birds adopted a relatively tolerant attitude, but as time passed, more and more airspace came under the control of man. The freedom that the birds once enjoyed was gone, trampled upon by Victor airways, control zones, and an ever-increasing number of aerodromes and arrival/departure corridors. With the increase in the total number of aircraft, the number of midair collisions between man and bird has soared at an alarming rate. Serious injury and death are now commonplace in most bird communities.

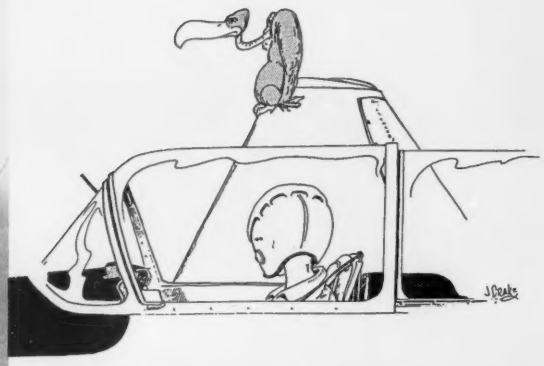
In the Naval Air Training Command, the total number of birdstrikes has increased significantly, initiating a popular theory of a **conspiracy aloft**. It is common knowledge that the bird population is demoralized with the present situation and plans to act decisively in order to regain some respect and cut their losses. Extracts from a secret communique, taken from a recently captured carrier pigeon, revealed that the birds are well organized and currently launching a series of carefully orchestrated attacks against naval training aircraft. Historically, the frequency of birdstrike incidents increase during the spring and fall months due to the birds' increased training deployment schedule to and from southern airfields. Apparently, there has been a marked increase in this training, thus accounting for the high number of birdstrike incidents.

Intelligence personnel, sensitive to the discontent of the birds, have uncovered several facts previously unknown about the birds' militia organization and order of battle. First, we note the heavy recruiting effort for pigeons, doves, and swallows. These birds are trained to infiltrate military hangars and disrupt maintenance in an attempt to alter aircraft weight and flight characteristics.

For the ultimate attack on airborne aircraft, the black vulture was selected. The vulture, a fierce rebel breed, is very well trained and of sufficient size to cause maximum damage.

ALOFT

By Maj T. W. Holden, USMC
VT-6



"Sir, I don't think this is in my pocket checklist."

These birds are generally found in flights of three and will decoy pilots prior to their attack by splitting up and simulating evasive action. The frontal attack is preferred by this species and they often use the sun to their advantage. These birds primarily target the soft, non-bird-resistant *Plexiglas* canopy but will also inflict heavy damage to airfoils. The black vulture has adopted the single strike "Kamikazi" philosophy and operates from numerous clandestine airfields throughout the southeastern United States. These attack birds operate under strict strike EMCON "A" requirements and use no external lighting.

With the increased organization among the birds, it is essential that today's naval aviators be trained in bird avoidance procedures. All squadrons should select an Ornithology Officer who will give bird recognition classes and intelligence updates covering known bird deployment schedules and bird flight characteristics. We must also improve the "see and avoid" survival method currently used during a bird attack. The destruction of aircraft, verified by the accompanying photographs, reflects the need for an active vice passive avoidance system. Obviously, the destructive nature of the birds demands respect and constant alertness on the part of every pilot.

Diplomatic efforts to curb this conspiracy have not gone well. To date, we have only convinced chickens and turkeys to walk rather than fly. Presently, negotiations with the feathered menaces have stalled, as they have not responded to our gestures of friendship or eventual extinction.

It is always the doubters of a conspiracy who become its eventual victims. Every naval aviator should contemplate the evidence presented here, study the facts in his personal environment, and take the necessary defensive action. ◄

NOT covered by NATOPS...

THE Foreword of every NATOPS Manual has an occasionally forgotten statement that its pages contain technical, performance, and also procedural data for safe and effective aircraft operations, but that they are not a substitute for sound judgment when faced with compound or unusual emergencies, limitations in facilities, or circumstances affecting lives and property of others. A VA-196 *Intruder* crew (LCDR Tim Thorsen, pilot, and LCDR Bill Greenlee, BN) illustrated exactly what that means when they successfully landed their disabled aircraft in an extreme configuration not addressed in NATOPS.

On the third touch-and-go during night FCLP, their A-6E suffered total separation of the left outboard flap. As full power was added at approximately 35,000 pounds gross weight, the aircraft made a severe, uncommanded nose pitchup accompanied by approximately 30 degrees left wing down and pronounced right yaw. LCDR Thorsen immediately applied full right, full forward stick and full right rudder to stabilize aircraft attitude in a slight left-wing-down, banked turn. The aircraft accelerated slowly but remained in a shallow banked turn at 10-20 feet AGL for approximately 1 mile before gaining enough airspeed and lateral control authority to level the wings and establish a positive rate of climb. The crew climbed to 6,000 feet for airborne troubleshooting. To diagnose the extent of damage, the A-6 crew requested an inspection from an airborne F-4.

The *Phantom* confirmed that the entire left outboard flap section was missing, but no other damage was discernible. The crew declared an emergency, with an estimated 10-minute delay for controllability checks, and minimum controllable airspeed (V_{mc}) was determined to be 140 KIAS at 19 units AOA. The crew concluded that final approach speed in this asymmetric configuration would be approximately 145 KIAS. After approximately 15 minutes of airborne troubleshooting, the A-6 crew set up

for a long straight-in approach to a midfield arrestment.

The CVW-14 LSO positioned himself abeam the target wire for a talkdown/fly-in approach. Due to the very high stick forces required, the pilot set the power at approximately 92 percent and made the approach with two hands on the stick. The first approach was a bolter due to confusing runway marker lighting and intermittent reception of the LSO's portable radio. During the second approach, Paddles' transmissions were more readable, and he illuminated the midfield touchdown point with LSO truck headlights, giving the pilot an improved visual reference. Fly-in engagement was successful, and the NAS crash crews converged immediately to disengage the wire and insert the gear safety pins.

In this rarely encountered flight regime, there were some interesting aerodynamic considerations during the critical seconds following flap separation. At 35,000-pounds gross weight, the normal approach speed with flaps intact is approximately 119 KIAS (22 units AOA). The left outboard flap section comprises approximately two-thirds of the trailing edge and approximately 53 percent of total flap surface area. At the moment of flap loss, most of the left wing assumed a configuration similar to having no flaps or slats extended. The sudden lift differential and resultant wing dip pushed the flapless portion close to the estimated stall speed. The aircraft was saved initially only by full forward stick, full power, and an assist from ground effect. Lowering AOA enabled the aircraft to marginally accelerate even though it was hindered by the high parasitic drag of a fully deflected rudder and starboard flaperon. In addition, the published safe limits of the Martin-Baker GRU-7 ejection seat were momentarily exceeded, and crew survival would have been doubtful during the initial recovery.

Neither the NATOPS Flight Manual nor the Pocket Checklist contain procedures for this emergency.

Left outboard flap.

Nevertheless, flightcrew and LSO decisions produced a reasonably safe and predictable outcome. Factors contributing to success in this instance were a light fuel load, two operating engines, and the availability of field arresting gear. But the common thread through this successful recovery was effective flightcrew/LSO coordination, full aircraft knowledge, and the sound judgment of knowing when not to rush unnecessarily into irreversible decisions. LCDR Thorsen and LCDR Greenlee are to be commended for their professional performance under such adverse circumstances. ◀

LCDR Bill Greenlee (left), LCDR Tim Thorsen (right).

**Eugene Ely, a civilian pilot for the Curtiss Exhibition Company, was the first pilot to make a takeoff from the deck of a ship. He took off from the deck of the cruiser BIRMINGHAM, anchored in Hampton Roads, on 14 November 1910. He died at the age of 25 as a result of a crash at Macon, Georgia. – Ed.*

Even Eugene Ely* had his off days

By LT Ben Harmon
VAQ-133

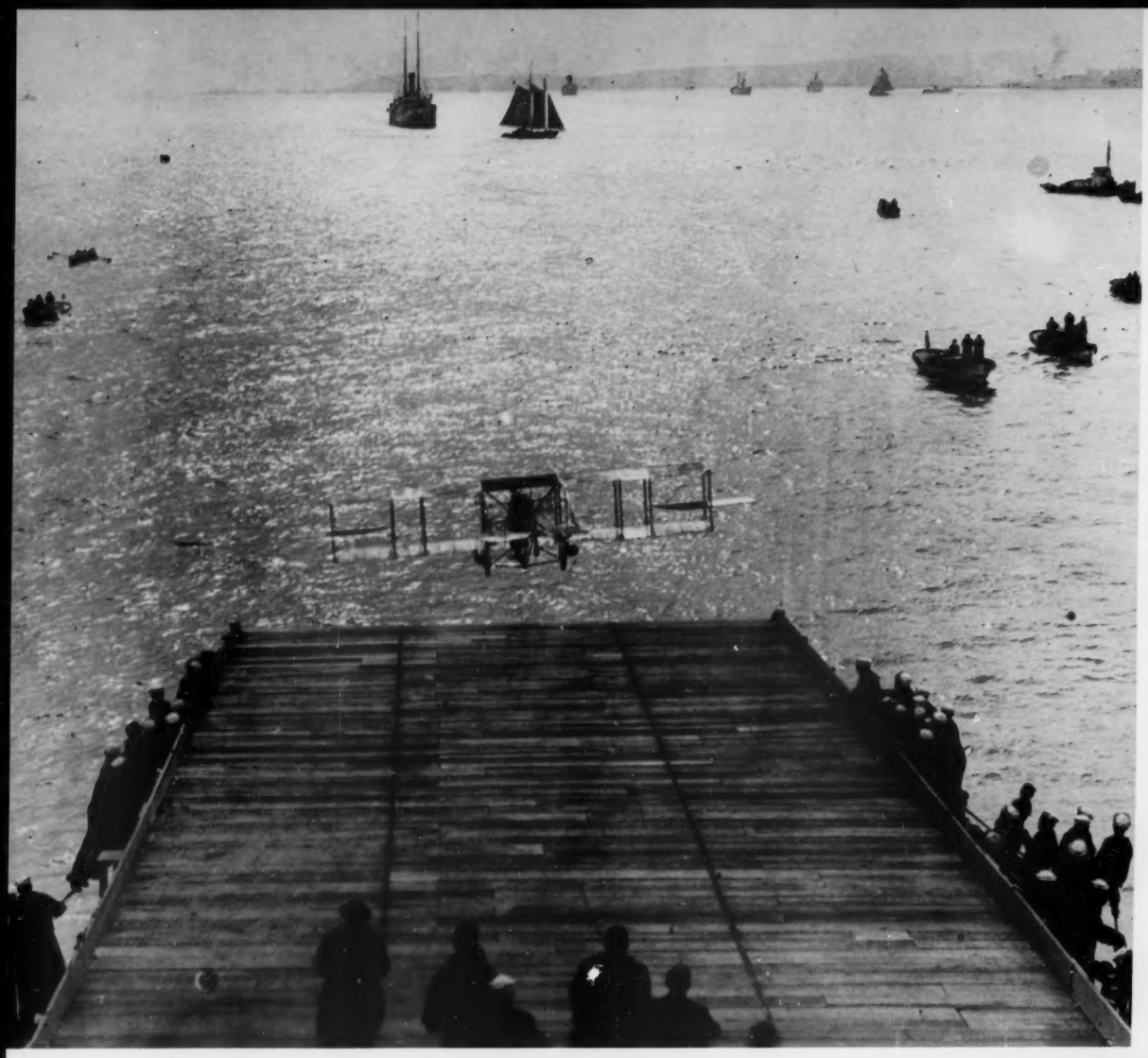
WE in the aviation community hear an awful lot about *the good old days* – that mythical golden era when men were men, airplanes were "up," and the skies were not cloudy all day. On closer examination, however, it becomes apparent that *the good old days* were not all that great. The accident rate in the '50s was going up at such an alarming rate that it prompted the development of the Naval Aviation Safety Activity. There were so many pilots out enjoying the airspace, often at each other's expense, that in the 1960s the FAA initiated positive control. In other words, the closely controlled and often restrictive flying we have today, and the big emphasis on safety, is not just something "they" came up with to make life miserable but can be attributed to a simple fact: people make mistakes.

It was easier to make mistakes a few years ago than it is now. Lack of positive control gave aviators a lot of leeway. Who was going to stop you if you decided to fly down the main street of your hometown at 200 feet?! Carrier aviation has always been demanding (that's half the fun, right?), but those early days must have been something. There are still those among us who remember flying "paddles passes" to straight deck carriers, where you had one shot at the deck and then it was the barrier. Of course, there was the advent of jets, where the tricky business of landing on the boat was further complicated by airspeeds in excess of 130 knots.

As if all that weren't enough, the fledgling aviator in those days had other influences pushing him towards falling on his sword. At one time, there was no such thing as NATOPS or the FRS. Training in a particular aircraft was handled at the squadron level. As a nugget, you might have received thorough instruction and a good checkout in your particular model aircraft, or you might not have been so fortunate. You stood a good chance of being in a squadron where "flathatting" was condoned or even encouraged. So there you were, performing at the outer edges of the envelope in a machine you may or may not have felt real comfortable with... Oh yes, on top of all that, there was still the inescapable fact: people make mistakes.

Several developments have been instituted over the years which should minimize our errors and maximize our longevity. Angled decks, improved lighting systems, and more standardized procedures have taken some of the guesswork out of carrier flight operations. The establishment of positive control airspace has widened the margin of safety when flying in our crowded skies. The Naval Safety Center has proved its worth in analyzing trends and keeping the community informed of all aspects of safety. NATOPS has provided a standardized approach to becoming familiar with your aircraft, and the FRS ensures that you have the basics before you get to your squadron. The command screening process supposedly ensures that those in positions of authority are mature, responsible individuals, capable of setting a good example and acting only in the best interest of their men.

But even with all these "good deal" developments, people are *still* screwing up and wasting lives and airplanes. Why?



Because programs have been improperly implemented, or they are being viewed with the wrong attitude. When the FAA instituted positive control in the '60s, it was viewed as an encroachment upon military training flights. True, it restricts our abilities to go wherever and whenever we choose, but at the same time it should be making better flyers out of us. By being conscious of altitude and airway restrictions, flightcrews have had to sharpen their techniques inside the cockpit, and in the long run, that discipline is going to help you put your bombs on the target.

The NATOPS program has been accused of making flyers too dependent on procedures rather than allowing them to use good judgment. Fair enough – the guy that only memorizes the asterisked items in the PCL is probably more dangerous than the *Sierra Hotel* hot dog who does it all his own way. That's why it's necessary for flightcrews to know their aircraft inside and out, to know *why* they are executing given procedures, so that when the time comes, they will be able to use good judgment.

Safety programs are often seen as a stumbling block, just one more thing that keeps you from flying. That's probably because in those commands the safety managers are more concerned with finding "gotchas" than with trying to *prevent* mistakes. A good safety program needs to be interwoven with all aspects of everyday squadron activity, enhancing operations rather than curtailing them. And that program needs support, especially at the top.

Flying (as we know it today) and the emphasis on safety have evolved because people do, and will continue to, make mistakes. *Safety* should never be used to restrict that unique spirit that makes men want to fly. Rather, it should be an incentive to sharpen the basic skills so that every maneuver is executed properly and every flight is a training experience that terminates safely on deck. In today's Navy, where airplanes and fuel are expensive and flight-hours and qualified men are scarce, we cannot afford any more mistakes. ◄

COMPLACENCY

By LCDR Al Sack
VS-28

WHAT is it? Who gets it? Why do commanding officers and safety officers constantly warn against getting complacent, especially during a long operating period or as a deployment draws to an end? Why is complacency frequently apparent in those work centers where personnel have performed so well in the past?

Webster's Dictionary defines complacency as "self-satisfaction accompanied by unawareness of actual dangers or deficiencies." The definition is precise, but how does it apply to each of us as we carry out our varied duties in the Navy?

The three traits that bring about complacency (overconfidence, familiarity, and boredom) are common to all of us at one time or another. Viewing these three characteristics in terms of the well-known *fire triangle* of fuel, oxygen, and heat, the presence of all three traits could lead to the ignition of an accident.

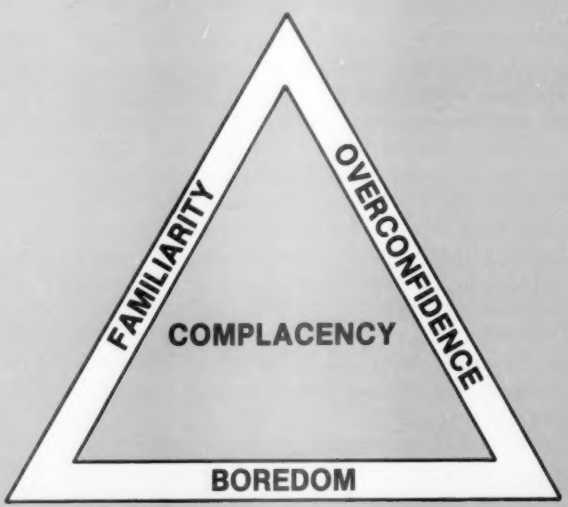
Each trait has its own symptoms, and by itself, may not cause a problem, but start coupling them up and catastrophe is waiting in the wings.

Overconfidence. Confidence in our abilities, which comes with knowledge and experience, is an admirable trait. But what can happen when we think we're "the greatest" at what we do? No one can tell us a thing. We know it all! Or do we?

Familiarity. There is an old saying that "familiarity breeds contempt," and it is probably true. The more routine you consider your duties, the less attention you seem to pay to details, and yet you still complete your tasks. You start to believe that a valve doesn't require inspection during PMS because it always checks good. You don't thoroughly and completely preflight an aircraft or piece of GSE because it was OK earlier, and you know it's still good now. You read a NATOPS manual and believe you thoroughly understand it, but you never, or rarely, go back and review it.

Boredom. All of us have periods when we feel bored, but this boredom may lead to daydreaming, absentmindedness, or distractions. This becomes apparent as you read a technical manual and find yourself thinking of home. How much information from the manual did you retain? You walk across the foul line on the flight deck at night. All you can think about is the way your supervisor chewed you out, and you don't hear the tower call that there is an aircraft on the ball. You're repairing a complex piece of equipment and you have to answer the phone. Did you continue where you left off, or did you skip a step?

The best way to keep the complacency triangle from forming is to consistently take pride in your duties. This is accomplished by being alert, confident, and knowledgeable of those duties. At the same time, give your work environment respect, wear the required safety equipment, be conscientious, and review and adhere to the recommended procedures. If each of us will do these simple things, we'll keep away from the complacency triangle and approach an accident-free environment in which we can safely work and live. ◄



SURVIVAL LIFERAFT BOARDING PROCEDURES

A-4, TA-4, A-7, TA-7, and S-3 Configuration

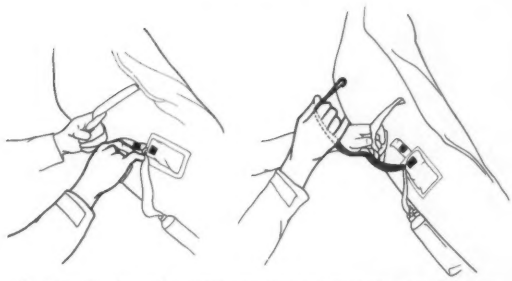
By CDR Jack Greear, MSC, USN
APTU – Norfolk
NAVREGMEDCEN, Portsmouth, VA

THE following scenario describes step-by-step procedures for liferaft boarding and preparation for use of signal devices following a low-altitude ejection, over water, in which ejection systems have functioned normally. The aircrewman has been able to inflate his LPA and release his parachute upon water entry and deployed his liferaft "in water" as described in the FEB '81 APPROACH.

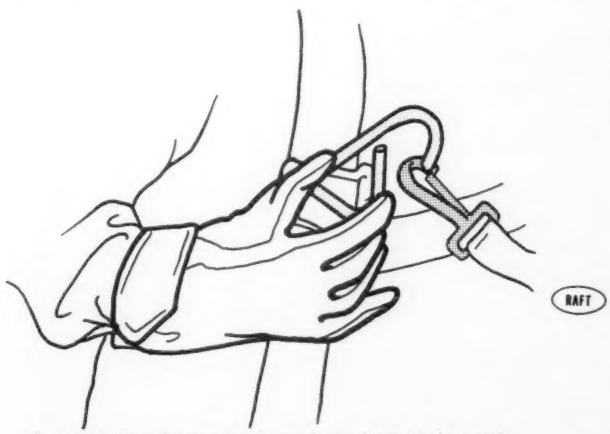
Although the RSSK illustrated is a RSSK-8 with ACC-377, "rafts" deployed from other types of RSSKs will be identical. In addition, on Martin-Baker systems, the parachute container will not be attached to the RSSK.

These techniques are being published in advance of the NAVAIR-00-80T-101 Survival/Egress Manual so they will get to the fleet as soon as possible and the project manager may receive any possible feedback before final printing. Please forward any comments to: Commanding Officer, Naval Regional Medical Center (Code APTU-230), Portsmouth, VA 23708.

1. Liferaft inflating.

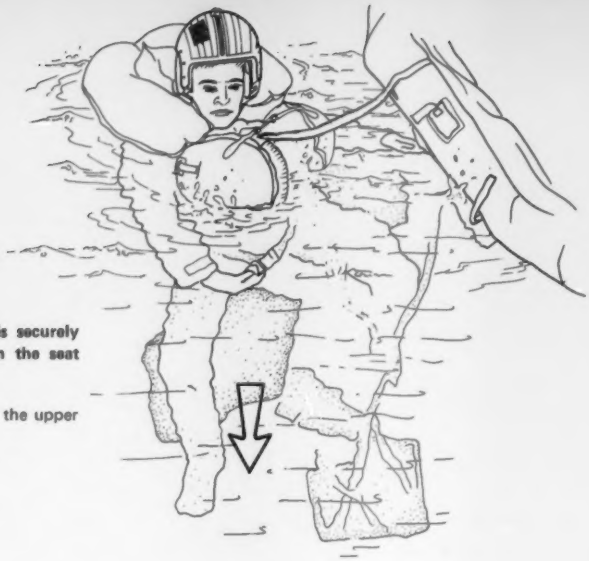


2. Locate the raft retention lanyard pocket that will be just above the CO_2 cylinder and remove the raft retention lanyard.



3. Attach the raft retention lanyard snap hook to the gated helo lift D-ring.

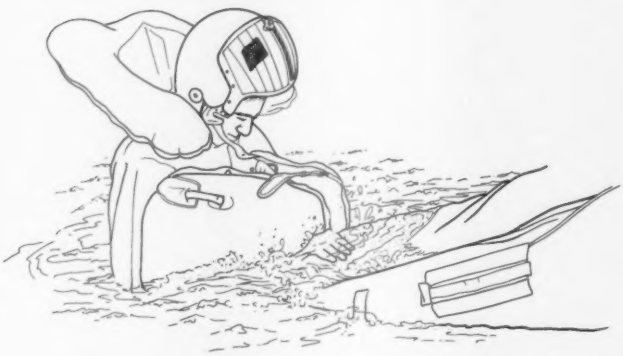
Continued



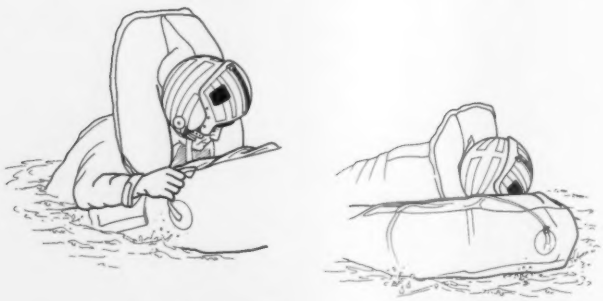
WARNING: Ensure the raft retention lanyard is securely attached and the O_2 hose is disconnected from the seat pan lid before completing this step.

4. Locate the Mini Koch fitting and then release the upper half of the kit.

5. Bring the liferaft around for entry into the smaller (stern) end.

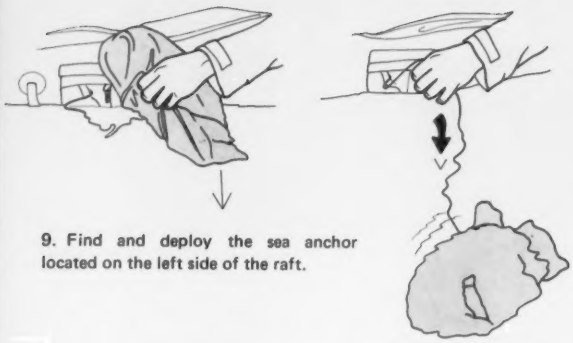


6. Grasp the stern and forcibly push it under the water's surface.

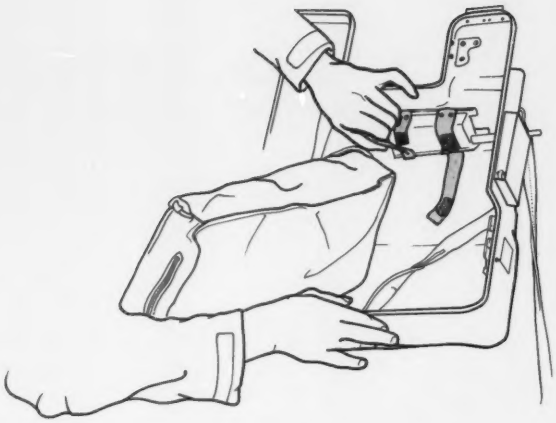


7. Utilizing the boarding handles, pull into the raft and turn to a seated position.

8. Move into a comfortable and well-balanced position.



9. Find and deploy the sea anchor located on the left side of the raft.



CAUTION: URT-33 is not tied, and once removed from its bracket, caution must be observed to prevent its loss.

12. Remove the URT-33 from its bracket.

10. Retrieve the lower and (see No. 11 for continuation).

13. Turn the URT-33 off if it becomes necessary to utilize the PRC-90. This will prevent the signal from the URT-33 interfering with the signals from or to the PRC-90.

11. Upper portions of the seat pan. Ensure that no sharp edges contact raft.

Artwork by Carolyn Dinicola Fawley.

Expect the unexpected

By LT Bruce P. Eaton
VA-27

THERE I was...27,000 feet, augering inverted and going down fast with no aileron control. Sounds like the beginning of a good sea story, but this one really did happen. We briefed thoroughly for a syllabus departure hop, covering the normal brief items plus loss of control flight and spin recovery. We also made it a point to bring up the need for long underwear due to the overall lowering temperatures and the snow in the mountains en route to our operating area.

As we proceeded to the operating area, we engaged in a mild tail chase to burn down fuel in preparation for the departures. Everything looked good, and seat straps were retightened while I set up for my first high-speed departure. Wanting to simulate an overshoot and max roll rate reversal, the setup had the chase A-7 at my 8 o'clock position. Reversing out of a hard right turn at 28,000 feet and 290 KIAS, my aircraft rolled approximately 140 degrees left and departed right. I got the usual poststall gyrations, followed by a few seconds of uncomfortable negative G. When the airplane finally established itself nose low, I noticed the airspeed was 200 KIAS increasing and the AOA was 19 units decreasing.

Attempting to roll to the nearest horizon, I found the ailerons were binding. Using the rudder to stop the auger, I was able to recover at 17,000 feet and 320 KIAS. Slowing down to 250 for control checks, the stick was not moveable to the right and had very little effectiveness to the left. My wingman joined up and checked for leaks and damage. With none visible, he noted the aileron on the left wing was moving slightly but no aileron or spoiler was visible on the right.

As we began the 100-mile leg to homebase, my wingman took control of communications and declared an emergency and our intentions, which left time for me to try and fly the aircraft at 15,000 feet. I attempted a dirtyup, but as the airspeed fell below 180 KIAS, the aircraft rolled uncontrollably to the left. The trailing edge flaps were beeped up to the 25-degree position and the *Corsair* was controllable down to 170 KIAS with rudder.

At that point, I was beginning to think my decision to wear long underwear was a good one. The aircraft felt stable at 15,000 feet, but I was not sure if I was going to be able to land it. Setting up for a 20 mile straight-in, we avoided overflying any populated areas, just in case. Having called base and advised them of the situation, an LSO was already on station near the arresting gear. At 5,000 feet, the denser air and the increased rudder authority with the gear down allowed flight at 150 KIAS.

The approach was almost like a fast Case III, and with the exception of a good scare when some turbulence caused roll inputs to the aircraft, the landing was OK. Paddles gave me a timely call for attitude just before rolling into the gear, and it was all over except for the paperwork.

The postflight maintenance inspection revealed that a self-locking nut, which is normally riveted in place for attaching the stick boot to the aircraft, had broken loose and was found lodged under the tube assembly in the control stick housing. While airborne I had a very strong desire to really apply some muscle to the stick and see if I could loosen whatever was causing the binding. Normal A-7 departure procedures also call for disengaging all modes except yaw stab of the AFCS. Since I was unsure of the problem and felt it may have been AFCS-induced, I luckily decided not to reengage any higher modes. The position of the culprit nut would probably have been aggravated by using control augmentation or "hamfisting" the stick.

What started out as a routine hop soon became another *white knuckle*,which ended safely due to proven NATOPS procedures and the help of an experienced wingman and an eagle-eyed LSO. I'm beginning to believe the old adage that no flight is routine, and I restate the title..."Expect the Unexpected." ◄

☆U.S. GOVERNMENT PRINTING OFFICE: 1981—735-003/1

DO NOT
FEED THE AIRCRAFT.

Naval Safety Center
NAS Norfolk, Virginia

Poster idea contributed by USS NIMITZ (CVN 68).

OBSERVE

55

It beats not driving at all.

Naval Safety Center
NAS Norfolk, Virginia